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Business History

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/fbsh20

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To cite this article: Riccardo Semeraro & José Antonio Miranda (2021): Surviving peace: Resilience and production decentralization in the Italian gun-making district, 1945–1970, Business History, DOI: 10.1080/00076791.2021.1987413

To link to this article: https://doi.org/10.1080/00076791.2021.1987413

Published online: 21 Oct 2021.

BUSINESS HISTORY
https://doi.org/10.1080/00076791.2021.1987413

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Surviving peace: Resilience and production decentralization in the Italian gun-making district, 1945–1970

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ABSTRACT

This article analyzes the key resilience factors of the Italian firearms district after World War II structured around four main questions: resilience of what, to what, by what means, and with what outcome. This study aims to improve and expand knowledge about the capacity and difficulties of industrial districts to adapt to market changes and maintain their competitiveness. Our findings highlight that the successful recovery was based on the conquest of a new market segment and a novel decentralised and flexible—although hierarchical—production structure achieved through the reorganisation of know-how and resources accumulated in the district. The advantages of local clustering and elevated levels of specialisation provided the district with an effective short-term adaptation to the post-war crisis and a stable long-term growth path.

KEYWORDS

Resilience; industrial districts; clusters; post-war recovery; firearms industry; gun making; industrial restructuring; Italian capitalism; entrepreneurship; regional economy; adaptation; adaptability

1. Introduction

> You come today among us, to a community that lives exclusively off its work, highly-qualified and honed by centuries of experience and commitment, and if the living conditions here are on the whole better than in other areas, it is due to the ability of our workers, the initiative of our entrepreneurs and hundreds of artisans, and the rich tradition of our vocational schools (Aa.Vv., 1988, p. 57).

With these words, Mayor Angelo Grazioli presented Gardone Val Trompia[1] (hereafter Gardone) to the Italian Prime Minister, Aldo Moro, on an official visit to the municipality in 1966. Grazioli was clearly referring to the gun industry when he emphasised the role of work in the life of his community. Despite the serious problems faced by its specialised production at the end of World War II (WWII), the town of Gardone was able to participate in the Italian economic miracle by renewing its long tradition in firearms production. Through the umpteenth restructuring process, its specialisation survived. It was reshaped into a network formed by the largest and oldest production units, together with countless craft businesses. This study

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aims to analyse the recovery process and identify the key resilience factors of the Italian firearms manufacturing district. The area, located 80 km east of Milan in the Lombardy region, northern Italy, still represents one of the driving manufacturing hubs of the country as the largest producer of small arms in Europe (ANPAM, 2017).

This study examines the resilience of the Italian gun-making district to changes in the market caused by the end of WWII and the development of the district's production structure in the 1950s and 1960s. It shows how, in the technological and market context of that period, the configuration of the industrial district specialised strongly in civilian firearms. The decentralised but hierarchical production structure—somewhere between the *Marshallian district*[2] (Becattini, 2004, pp. 7–17; Zeitlin, 2007, pp. 222–223) and the *hub-and-spoke district*[3] of Markusen (1996, p. 302)—was supported by local institutions in generating substantial capacity for adaptation and giving rise to a stable development pattern. The district relied on the know-how and resources accumulated in the territory to generate a novel production structure and specialise in new market segments. This reorganisation strengthened the district's competitive advantage and fuelled a new phase of growth. Two large companies led the process: Fabbrica d'Armi Pietro Beretta (hereafter Beretta) and Società Anonima Bernardelli Vincenzo (hereafter Bernardelli), which served as the backbone of the decentralised production structure and contributed decisively to the technological renewal and enhancement of the international reputation of the district's products.

The time frame chosen allows an assessment of the outcomes of reconstruction and an in-depth analysis of the protagonists and main factors behind reconstruction. This article broadens the knowledge about the development of the firearms district and the emergence of industrial districts in Italy in the central decades of the twentieth century while providing insight into the factors determining the resilience of industrial regions. By adopting a business history approach, this study provides new evidence for the debate on the sources of competitive advantage and the role of leading companies in the evolution of these districts. It also enriches the analysis of the post-war recovery of Italian production systems, incorporating the concept of resilience and the theoretical framework that economic geography has developed around it.

The topic is relevant and deserves detailed research, as industrial districts have played a key role in the economic development of many places, particularly in southern Europe. Currently, when many industrial districts are witnessing a period of severe decline, due in part to their difficulties in adapting to market changes, it is crucial to deepen our understanding of how the districts weathered other market shocks, how they kept their competitiveness, and what were the pillars of their resilience.

This study is based on numerous unpublished written and oral sources. The written sources include the original questionnaires and summary charts of the industry and services census conducted by Istat (Italian National Institute of Statistics) in 1961, as well as reports and other documents on the state of the post-war firearms industry drawn from several local and national archives. The oral sources include three semi-structured interviews conducted by the authors with entrepreneurs from the district in Gardone between February 2016 and October 2017.

These interviews were designed, conducted, analysed, and reported following a rigorous methodology (Adams, 2015). The information derived from them is particularly useful in explaining how and why events occurred, revealing undocumented details of relationships, and filling gaps in extant documentary records (Crawford & Bailey, 2019, p. 7). Moreover,

cross-checking oral sources with written ones was useful for two reasons. First, archival documents enabled us to avoid interview limits arising from memory distortion produced 'by physical deterioration and nostalgia in old age, by the personal bias of both interviewer and interviewee, and by the influence of collective and retrospective versions of the past' (Thomson, 2007, p. 53). Second, the interviews prevented the study from falling into the trap of inadvertently repeating the narratives told by hegemonic stakeholders, such as policymakers and leading companies, which forms the basis of most of the Italian armament business historiography (Maclean et al., 2017, p. 1233).

For these reasons, the study required a *purposeful sample* of district members (Patton, 2015, p. 264). The interviewees—Pierangelo Pedersoli, Cristina Abbiatico, and Emanuele Sabatti—possess extensive knowledge of the gun industry; their family businesses were deeply embedded in the local production system and operated in crucial segments during the years under investigation. Pedersoli is the owner and chief executive officer of the Davide Pedersoli & C., a family business established by his father in 1957, and a specialist in the production of historical firearm replicas. Pierangelo has been president of the Consorzio Armaioli Italiani since 1988 and holds several important institutional positions in the Italian firearms world. Abbiatico is the former chief executive officer of Famars, a gun-making firm founded in 1967 by Mario Abbiatico and Remo Salvinelli, which is well known in the firearms world for its patented detachable-lock designs and handcrafted woodworking and engraving. Sabatti is the sole director of Sabatti Spa, which commands a prominent position in the manufacturing of hunting and sporting shotguns; it was established in 1960 on the ashes of other family businesses and played a crucial role in the production of firearms components.

This article follows Martin and Sunley (2015, p. 12), whereby the study of any resilience process should answer four fundamental questions: resilience of what, to what, by what means, and with what outcome. After this introduction, we review the concept of resilience and prior literature on the resilience of industrial districts. The third section describes the characteristics of the Italian arms manufacturing district up to WWII and analyzes the crisis that was experienced at the end of the war. We then explore how the district adapted and recovered from the crisis by specialising in new market segments, followed by an examination of the factors that enabled adaptation and laid the foundation for the district's new competitive advantage. This study concludes with a summary of our main findings.

2. The resilience of industrial districts

After the economic crisis in 2008, academic interest in economic fluctuations, crises and recovery processes, and the notion of resilience was revived, spreading from natural sciences to economics and regional studies. There is no unanimously accepted definition of *resilience* (Martin et al., 2016, p. 564), although Martin and Sunley (2015, p. 4) identified three primary variants. The first, *engineering resilience,* describes the ability of a system to regain its previous equilibrium after a shock. The second, *extended ecological resilience,* refers to the ability to absorb such events without modifying the structure, identity, and function of the system, although some of its characteristics change. The third definition, *evolutionary resilience*, was developed by economic geographers and describes resilience as a positive adaptation to shocks that allows the system to survive through changes even when they are massive and radical. According to this approach, regardless of the degree of transformation that they undergo in the recovery process, less vulnerable economies are more resilient and recover

faster from shocks to sustain long-term development. This evolutionary process creates new growth paths rather than recovering to a stable state of equilibrium (Simmie & Martin, 2010, p. 31).

From a historical perspective, the concept of evolutionary resilience is especially suitable for analysing the processes of economic recovery after crises in industrial territories, because it proposes a long-term vision that considers both the industrial structure and networks of economic agents and institutions (Boschma, 2015, p. 743). Our analysis of the recovery of the firearms district is based on the concept of evolutionary resilience combined with two other interesting concepts contributed by economic geography: *adaptation* and *adaptability*. According to Pike et al. (2010, p. 9), *adaptation* can be defined as 'a movement towards a pre-conceived path in the short run, characterised by strong and tight couplings between social agents in place', while *adaptability* would be 'the dynamic capacity to effect and unfold multiple evolutionary trajectories, through loose and weak couplings between social agents in place, that enhance the overall responsiveness of the system to unforeseen changes'. Drawing from these concepts and theoretical proposals of economic geography can be very useful for business history because they offer a structure for historical research, as pointed out by other studies (Amdam et al., 2020, p. 2; Plantinga, 2020, p. 2). Moreover, historical analysis can decisively contribute to supporting the theories of economic geography with empirical evidence and enriching their approaches by framing them in a certain technological and economic context, and by considering the influence of stakeholders' decisions (Henning, 2019, p. 608).

In situations of resilience, available resources and capabilities influence the adaptations made to the new context; such factors are mostly the result of previous patterns of regional development and the intervention of local or national institutions (Simmie & Martin, 2010, p. 32). According to the approaches of economic geography, diversified economies tend to resist negative impacts better because their activities are not equally affected. Their heterogeneity increases their adaptability and the possibility of developing new growth paths (Davies & Tonts, 2010; Dawley et al., 2010, p. 657). Despite this, closer relationships among different industries in a region, especially concerning knowledge and skills, foster a greater ability to positively adapt, recover, and evolve, making adaptation and adaptability compatible (Boschma, 2015; Frenken et al., 2005). This heterogeneity is path-dependent and strongly influences regional resilience. Taking a business history approach, Amdam et al. (2020) highlighted that the ability to recover from external shocks in the Norwegian region of Sunnmøre between 1920 and 2010 was widely supported by the development of various related activities. Unlike regions with diversified industries, specialised regions are considered to have an elevated level of adaptation but low adaptability, as they can suffer a state of negative lock-in with little potential to recombine resources to develop new activities (Boschma, 2015, p. 739).

Unfortunately, there is a paucity of literature on the extent to which the concentration of activity in highly specialised industrial districts influences resilience. In principle, we would expect districts to have a greater ability to adapt and overcome crises, given that external economies of agglomeration, together with the typical combination of competition and cooperation within industrial districts, have a positive effect on companies' efficiency and innovation (Miranda & Montaño, 2017; Porter, 2003; Signorini, 1994; Spencer et al., 2010). Strong links among companies can weaken the effects of a negative shock because of long-term relationships with customers, a more efficient labour market, and trust among economic

agents and local institutions that can facilitate credit (Delgado et al., 2016). Moreover, the cognitive and social proximity among the economic stakeholders of the district favours an efficient adaptation to technological and market changes because it improves information transmission and reduces the risk of opportunistic behaviour (Crespo et al., 2014, p. 204).

However, since agglomeration economies do not necessarily provide the capacity to withstand technological or market disturbances, they do not guarantee long-term economic success (Wilson & Popp, 2017, p. 8). The strong specialisation of industrial districts, along with the interdependent relationships among companies, could represent a disadvantage (Acemoglu et al., 2013; Barrot & Sauvagnat, 2016). Many districts have succumbed to crises throughout history and have ultimately disappeared (Toms & Filatotchev, 2017, pp. 81–87). Other districts, whose specialisation has survived over time, such as the concentration of British pottery manufacture in North Staffordshire, have based their resilience more on companies' strategies than on district dynamics (Popp, 2001).

The debate on the resilience of industrial districts has largely focussed on their ability to cope with the challenges arising from economic globalisation since the late twentieth century. However, although globalisation has generated a critical juncture for many districts, the study of the adaptability of these socio-economic structures cannot be limited to that period. A historical analysis allows us to observe strong recessive impacts faced by districts at other times, and how their evolution has been affected by internationalisation processes and many other endogenous and exogenous factors (Belussi & Sedita, 2009, p. 506). This article investigates the adaptation process at another critical juncture—the crisis after WWII—and the configuration of a new international economic order. It should be noted that the firearms district was not the only case of successful long-term adaptation after the post-war crisis in highly specialised industrial territories. A similar trajectory can be observed, for example, in other local production systems of the so-called Third Italy, which were able to recover and engage in steady growth, at least until the 1980s, competing successfully in national and international markets (Grandi, 2007, pp. 33–40; Nuti, 1992; Pyke et al., 1990).

Explaining differences in districts' coping abilities to markets and technology changes throughout history, Zeitlin (2007, pp. 225–227) highlights the importance of having effective institutions for conflict resolution and the provision of collective services. Districts with effective internal coordination and governance mechanisms to deal with collective problems are better positioned to face difficulties and adapt to new challenges. Similar conclusions emerge from studies by Hashino and Kurosawa (2013) and Amdam and Bjarnar (2015). Wilson and Popp (2017, p. 8) also underline the importance of the institutional environment while contributing other elements to the list of factors that profoundly affects the capacity of industrial districts to endure disturbances and shocks. These factors include the national and international macroeconomic context, the nature of negative impacts, the internal structure of production concentrations (their composition of activities and relationships), and the specific dynamics of stakeholders.

From a business history perspective, the individual and collective behaviour of the district's stakeholders is especially relevant. Most studies on the determinants of resilience have focussed on the structures of regional or local economies, indicating which structures are more sensitive to recessive impacts and which have greater adaptive capacity. However, there is a paucity of literature on how resilience works over time, and little attention has been paid to stakeholders and elements that enable some regions to show greater resilience than others (Bristow & Healy, 2015, p. 242). By focussing on the case of the Italian gun-making

district, this study investigates the behaviour of economic agents and public institutions in industrial districts during crises, showing the relationship between the adaptive response and economic, social, and institutional contexts. The theoretical framework of economic geography provides a structure for historical analysis, while in-depth historical analysis of a specific case enables us to qualify theoretical approaches while revealing the influence of production specialisation and context in the resilience process.

Our investigation into the Italian gun-making district's resilience in the post-war era is also significant for other intertwined reasons. First, it bridges a gap in the historiography of the local production system. Despite numerous studies on its production dynamics in the early and late modern periods (Semeraro, 2017–2018), a detailed and theoretically well-grounded analysis (Becattini, 2004; Markusen, 1996) of its structure in the 1950s and 1960s is still lacking. Second, our study contextualises the development of the Italian light weapons sector in the post-war transformations of the military industry and, accordingly, contributes to the historiography of the national arms trade. This corroborates that, after WWII, this industry underwent a reorganisation rather than a complete restructuring process (Selva, 2009, p. 272); in the district under investigation, this industrial reorganisation took place through novel specialisation within the arms trade. Moreover, our study supports Selva (2009, p. 267), whose findings clash with mainstream studies on the Italian military industry in the second half of the twentieth century (Battistelli, 1980; Segreto, 2005; Simoncelli, 1994), by providing evidence that, alongside state intervention, production specialisation, diversification, and strong initiatives to enter foreign markets were crucial factors in overcoming crises and adapting the sector to changes in the structure of domestic and international demand.

3. Post-war crisis: the umpteenth turning point in a long story

In the mid-twentieth century, the core of the gun-making industrial district of Brescia included the central area of the Trompia Valley (Val Trompia), comprising the towns of Gardone, Marcheno, and Sarezzo. Gun-making firms were also based in other towns and villages of Brescia province; however, the central Val Trompia was more highly concentrated and specialised in the sector (Fontana, 2009; Rinaldi, 2008, pp. 192–193; Semeraro, 2017, pp. 69–72; Tombola, 2000). This was due to the war and post-war dynamics, together with 'the result of a long and enduring historical process […] dating back to the age before the first industrial revolution' (Colli, 2009, p. 59).

The gun industry in Val Trompia has *early modern* roots. In the sixteenth century, in Brescia province, firearms manufacturing developed out of the prosperous mining and iron industries that flourished during (if not before) the Middle Ages (Montanari, 1982). This activity was organised according to a scheme based on strong production fragmentation, a *putting-out system*, strong family ties, and craft guilds. Centred in Gardone, a network of workshops active in the field with different skills and duties spread to the surrounding villages and, following the Mella River, reached the city of Brescia (Belfanti, 1998; Mocarelli & Ongaro, 2017; Morin & Held, 1980, pp. 55–56).

Over the centuries, local gun-making has undergone periods of great prosperity and profound crises, from which it was able to recover due to changes in its production structure, the activities of specific producers, and the intervention of government authorities (Semeraro, 2017–2018). The late nineteenth century represents a turning point in the modernisation

and industrialisation of this local production system. During this period, the governmental authorities of the Kingdom of Italy revived local production by reactivating the two seats of the local government arsenal, previously opened by Napoleonic France and subsequently closed by the Austrians (Montanari, 1999), and by introducing technological innovation into the production process. Although the stimulus from public intervention was limited and influenced by political rather than economic reasons, it motivated certain firms to take charge of the district. These companies flanked the government arsenal and diversified by investing in the manufacturing of hunting weapons. They led the district, albeit in a persistently backward fashion compared to other European production centres, during a long transition phase before the significant transformations of the interwar years (Semeraro, 2020).

After experiencing a sharp increase in production during the Great War (Semeraro, 2019), the district had to contend with a significant reduction during the return to peace. This was coupled with long delays in adopting the most advanced production techniques. Throughout the Fascist Period, in stark contrast to what was happening in the rest of the world, the degree of technological progress in the Italian light weapons industry was very modest, due to the substantial absence of industrial investments in labour-saving plants and machinery. Such delays prevented the occurrence of concentration and restructuring processes similar to those occurring in other European districts at the time. In Brescia, antiquated pistols and nineteenth-century rifles continued to be produced. Changes only occurred in the late 1930s, when large state orders were placed as a result of the new nationalistic economic policy of the fascist regime that provided local firms with great earning and growth opportunities (Del Barba, 2008, p. 88).

The production and technological conditions of the district in the interwar years are well illustrated by the development of its two leading companies, Beretta and Bernardelli. Beretta did not embrace Taylorism until 1928, when machinery acquired from the firm Fabbrica d'Armi Lario, Como, was transferred to Gardone, requiring a reorganisation of the plant and layout. This historical company took a dimensional leap in 1935 when, because of the Second Italo-Ethiopian War and Italy's intervention in Spain, it could benefit from large orders for the 1934 Model pistol, effectively launching its mass production (Jaikumar, 2005, pp. 69–70). Meanwhile, Bernardelli also made significant progress towards increasing its production: in 1936, it became a limited company and increased its share capital substantially. The company redefined and expanded its production sectors: it no longer exclusively produced weapons but became a specialised mechanical engineering company capable of marketing its firearms while simultaneously conducting processes outsourced by other companies (Del Barba, 2008, pp. 99–101).

On these technological and commercial bases, the district's production developed during WWII. Gardone and the surrounding municipalities were distinctive in their manufacturing footprint, industrial production structure, and pervasive technologies in the transformation of ferrous materials. Work, trade, machine tools, rifles, and metal ropes characterised daily life. Large firms—Beretta, Bernardelli, and others—that converted their production to support the war effort dominated the local production system and gave rise to mechanisation and vertical integration strategies. Craft businesses were almost non-existent, and the production of hunting firearms disappeared. In this context, salaried employment was essential for individuals, families, and social relations (Simoncelli, 1996; Baglioni, 2012). Italy's entry into the war provided local firms with large orders and, consequently, with strong profits for the duration of the conflict. The district sidelined the production of civilian firearms to

concentrate most of its resources and capabilities in manufacturing and repairing the Italian army's light armaments, although these were mostly obsolete when compared to the standards reached by other belligerent powers. Within this context, the local government arsenal maintained its crucial position as a major producer and the main source of orders of finished guns and spare parts subcontracted in the area (Albesio, 1969, p. 237; Del Barba, 2008, p. 110).

The last two years of the conflict severely affected Italy and its population. At the end of the war, the country faced pressing problems, mainly due to shortages of fuel and raw materials, precluding it from resuming its production and exports. Material destruction was compounded by high unemployment and poverty. Nevertheless, considering the Allied bombings and German occupation of northern Italy, the economic infrastructure was less impaired than expected. Despite widespread and heavy damage to agriculture, the merchant navy, and the rail network, the national industry's production capacity fell by an average of only 10% compared to the pre-war period (Zamagni, 1997, pp. 29–30).

The conflict did not trigger any acceleration in the field of industrial research and development nor had it stimulated, as was the case in other countries, a leap in technology. This further aggravated the distorting effects on production generated by the constant demand for equipment and war materials during the conflict (Crepax, 2002, p. 277). In the aftermath of the war, Italy dealt with the backwardness of its secondary sector and a serious problem of overproduction capacity. Although less traumatic than those experienced during the first post-war era, the Italian entrepreneurial class had to deal with significant re-conversion issues (Amatori, 1980, 2011; Mantovani, 1975; Mori, 1994). This was particularly true of the firearms industry, where the difficult situation was further aggravated by the almost total demilitarisation imposed by the binding clauses of the peace treaty of February 10, 1947. The latter established an international commission for the control of Italian production and investments in the military sector and imposed significant limits on the production and sale of arms (Bagnato & Verrini, 2005, p. 45; Battistelli, 1980, p. 121; Simoncelli, 1993, p. 81).

In the gun-making district of Brescia, the end of the war led to the suspension of Beretta's production of individual weapons and machine guns for the Italian Social Republic and the interruption of Bernardelli's contracts from Fiat, Breda, and the government factories of Terni, Rome, and Torre Annunziata. The Allies placed Beretta and Bernardelli under temporary receivership until 1948. The termination of war production contracts dealt a harsh blow to the arms manufacturing of Gardone and the other villages in the valley—the local system was on the brink of collapse in 1945 (ASBI, BI, Studi, Pratiche, n. 453, f. 1; Del Barba, 2008, pp. 136–147).

According to a report by a committee of the Italian Ministry of Industry and Trade, at the end of the war, in Brescia province, where almost all national small arms producers were located, five enterprises with seven production units survived—Breda, Beretta, Bernerdelli, Fabbrica Nazionale Armi, and Franchi, along with a few craft companies such as Gitti Umberto, Fabbrica Armi Anelotti and Gualla, and Faverzani Pietro. Several other firms (such as Gnutti and Tempini) participated in military production efforts during the war years. However, they were not part of the gun-making industry as they normally operated in the steel and mechanical engineering sectors. During wartime, they temporarily adapted their production to take advantage of military contracts; consequently, for them, reconversion was less arduous. The companies most damaged by the bombings were in the province's capital, where the Breda factory lost 70% of its production capacity. In 1946, the provincial gun-making industry accounted for 6,500 employees with a surplus of 40–50% to needs (ACS, MIC, b. 107, 'Relazione sulla situazione industriale nel settore armi', pp. 1–4).

High taxes and labour costs, which represented between 75 and 80% of the product's selling price, affected arms producers (ACS, MIC, b. 105, 'Relazione 1948', p. 129, and 'Relazione 1949'). In 1948, the situation deteriorated when the OM company (automotive sector), which had taken over the government arsenal after its closure by the Nazis in 1943, decided to vacate Gardone to reduce its costs with the loss of 1,500 jobs. In 1949, 5,000 people were estimated to be unemployed, and the workforce of local gun firms had been severely cut (ACGVT, Storico, b. 790, ff. 4.1–4.6). Table 1 includes data sent by the Brescia Chamber of Commerce to the Italian Ministry of Defense. It shows the dramatic consequences of the provincial arms industry crisis on employment and highlights that the firms that suffered most were those based in Val Trompia, specifically those that specialised in gun-making.

4. The shift towards civilian firearms: driver of the recovery

To cope with the sharp post-war market contraction, some firearms companies embarked on a related diversification strategy, commencing the production of other metal products. However, this diversification strategy had little success due to difficulties encountered in overcoming the market competition and adapting the gun-making machinery—arising from specificity and the wear and tear caused by intensive use during the conflict—to new types of manufacturing (ASCCBS, Carteggio 1943–1963, Categorie X–XXI, b. 261, f. 5; ACS, MIC, b. 105, 'Programma produzione anno 1946/1947'; and b. 107, 'Relazione sulla situazione industriale nel settore armi', p. 3). In the early 1950s, Breda Meccanica Bresciana began producing motors, but soon had to succumb to competition from Lambretta and Vespa. Beretta constitutes another example of a gun-making company that pursued a diversification strategy and obtained mixed results. In 1948, the historical company registered two patents related to the transportation sector. More specifically, these patents were for two fundamental motor vehicle components—the engine and suspension—that formed the basis of the development of an economy car. However, production was never launched by the company. Starting in 1950, Beretta decided to increase its share in the capital of Mival, which in 1949 had acquired a portion of the plant of the local government arsenal. In this example, the diversification strategy was characterised by successes and challenges. The firm achieved good results in the machine tools industry but experienced significant problems in the production of vehicles and audio and video systems, two sectors that Mival abandoned in the mid-1960s. Pioneering, but very short-lived, was the investment made by Beretta together with Underwood Corporation (a foreign partner) in Underwood Italiana Spa. The company was established in Gardone in 1958 to manufacture office machinery and accessories. However, due to significant losses, Beretta sold the majority share to Olivetti in October 1959 and vacated the board of directors in February 1960 (Onger & Paris, 2012, pp. 85–110; Paris, 2016).

The most effective response to the crisis caused by the interruption in military orders was the search for new market segments within the arms sector. The conversion of production to civilian firearms enabled the local system to find a new growth path. Specialisation in hunting and sporting shotguns enabled local producers to benefit from Italy's gradual integration into international markets and provided new impetus to the industrial district. The shift made it possible to take advantage of the unemployed skilled labour force and avoid the loss of human capital in the district. This process was conducted by deepening the decentralisation of production and informal production coordination mechanisms following the Marshallian industrial district. Many people who had lost their jobs were skilled workers

Table 1. Arms firms' employees in the province of Brescia (1952).

			Employees				
			1943		1952		
Firms	Incorporation	Legal head office	Firearms production	Other production	Firearms production	Other production	Products (1952)
Fabbrica Armi Esercito	1859	Gardone	2,500	0	0	300	n.a.
S.a. Bernardelli Vincenzo	1865	Gardone	700	0	500	0	Hunting shotguns, semi-automatic pistols, machineguns, fuses, engine parts,
S.a. Fabbrica d'Armi Pietro Beretta	1526	Gardone	3,000	0	1,625	0	Hunting and sport shotguns, semi-automatic guns, automatic rifles, machineguns
Armerie Gnutti	1860	Lumezzane	3,000	0	0	500	Semi-finished products of copper, brass, and aluminium
S.a. Officine Carlo Gnutti & Figli	1929	Lumezzane	1,800	0	0	430	n.a.
S.p.a. Officine Meccaniche Saleri	n.a.	Lumezzane	600	0	0	170	n.a.
Breda Meccanica Bresciana	1926	Brescia	5,800	0	710	0	Hunting shotguns, weapon parts, mechanised looms
S.p.a. Metallurgica Bresciana già Tempini	1904	Brescia	4,500	1,500	0	1,300	Semi-finished products of steel and copper
S.p.a. OM	1917	Brescia	1,500	2,500	0	3,300	Trucks, tractors, diesel engines
S.a. Fabbrica Nazionale d'Armi	1937	Brescia	2,650	0	470	0	Hunting shotguns semi-automatic rifles, mechanical machining
S.a. Luigi Franchi	1868	Brescia	300	0	100	0	Hunting shotguns, semi-automatic rifles
F.lli Marzoli & C.	1851	Palazzolo	2,000	1,000	0	2,100	Textile machinery
Total	–	–	28,350	5,000	3,405	8,100	–

Source. ASCCBS, Carteggio 1943–1963 - Categorie X–XXI, b. 261, f. 5; FONDAZIONE CIVILTÀ BRESCIANA (2021) (data processed by the authors).

trained in large factories in the valley, especially in Beretta and the government arsenal. Some of them had attended the local vocational school with general studies in mechanical engineering and specific training in gunsmithing (Abbiatico, 1984; Baglioni, 2012). Many of the valley's inhabitants decided to start businesses by opening small workshops to reinvest their technical skills in the manufacturing of hunting shotguns. According to surveys of the Bank of Italy's provincial branch, around 100 craft gun-making firms operated in the area in 1953, rising to 130 units three years later (ASBI, BI, Studi, Pratiche, n. 469, f. 1, and n. 874, doc. 14). These micro-enterprises addressed two domains: 1) market niches based on a high degree of product customisation, as these small firms could dedicate themselves entirely to meet their customers' needs; and 2) the subcontracting market, where they were able to carry out specific tasks or supply firearm parts at a lower cost to large companies and newly established craft enterprises (ASBI, BI, Studi, Pratiche, n. 459, f. 1; Fausti, 1954, p. 5; Fontana, 1955).

Figure 1 shows the direct relationship between the production of civilian firearms and the vast flourishing network of small businesses. In 1961, a total of 101 local businesses (37% of the total) were end-producers, primarily manufacturing civilian firearms, and employing 593 people, thus representing 19% of the firearms production labour force in the three towns under study (Gardone, Marcheno, and Sarezzo). They were mainly artisans who reinvested their craft skills by opening small businesses that focussed on a small number of products, especially *side-by-side* shotguns in the early post-war era, and *over-under* shotguns in the 1960s. The dates of incorporation further confirm that the network of SMEs developed significantly after Liberation: only five of the 101 businesses in the category of *Civilian firearms manufacturing* were established before 1945. Of the 272 firms in the district, only 19 were created before that date (ASCCBS, Carteggio 1943–1963, Categorie XXII–XXXII, bb. 947, 959, 980).

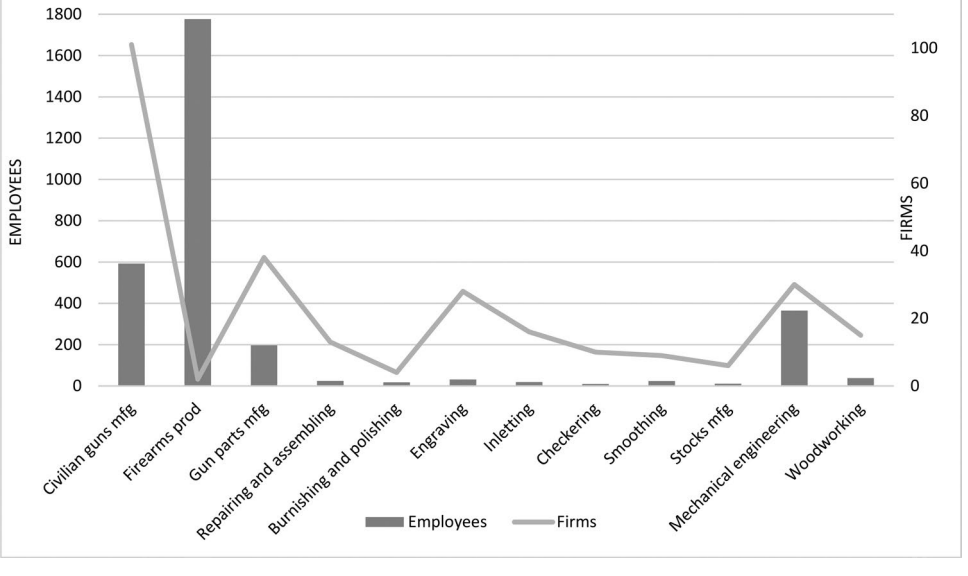

Figure 1. Firms and employees per type of activity in the firearms industry of Gardone, Marcheno, and Sarezzo (1961).
Source. ASCCBS, Carteggio 1943–1963, Categorie XXII–XXXII, bb. 947, 959, 980 (data processed by the authors).

Large factory owners did not ignore the growth of an intense network of craft businesses. In 1950, when the sector was still struggling, they drafted a report to the Ministry of Industry and Trade, complaining about the illegal position of many small workshops that had recently opened (ASCCBS, Carteggio 1943–1963, Categorie I–IX, b. 97, f. 19). According to industrialists, there were two major problems. First, many craft businesses were not listed in the Companies Register, nor were they authorised by the relevant authorities for firearms manufacturing and marketing: the report estimated that 4,338 shotguns out of 9,985 in 1948, and 3,970 out of 15,778 in 1949, were produced clandestinely. Second, craft businesses largely relied on black market labour (unemployed people or workers from other factories moonlighting during their non-working hours), paying the labour force half their normal salaries with no social security contributions. This report showed that the district's cost competitiveness was not only supported by greater efficiency, but also by utilising the informal economy.

Data on the guns provided by the Banco Nazionale di Prova (National Proof House; hereafter BNP) also demonstrate that new entrepreneurs specialised in civilian firearms, while the production of military weapons was concentrated in large traditional companies (Figure 2; ASBI, BI, Studi, Pratiche, n. 929, doc. 9). After the war, the production of long guns gradually increased from zero to a peak of 320,324 units in 1968, surpassing the 100,000- and 200,000-unit thresholds in 1954 and 1964, respectively. The double-barrelled hunting shotgun played a vital role in the recovery; more specifically, side-by-side shotguns led to recovery throughout the 1950s, whereas over-and-under shotguns—first produced industrially and then by artisans—led local production in the 1960s. From the 1960s onwards, the growth of semi-automatic rifles and shotguns was also highly significant. Semi-automatic rifles and shotguns drove the development of the most heavily industrialised companies, but their potential was progressively limited by statutory regulations restricting their use and distribution. Short-barreled firearms for personal defense were manufactured mainly by larger companies;

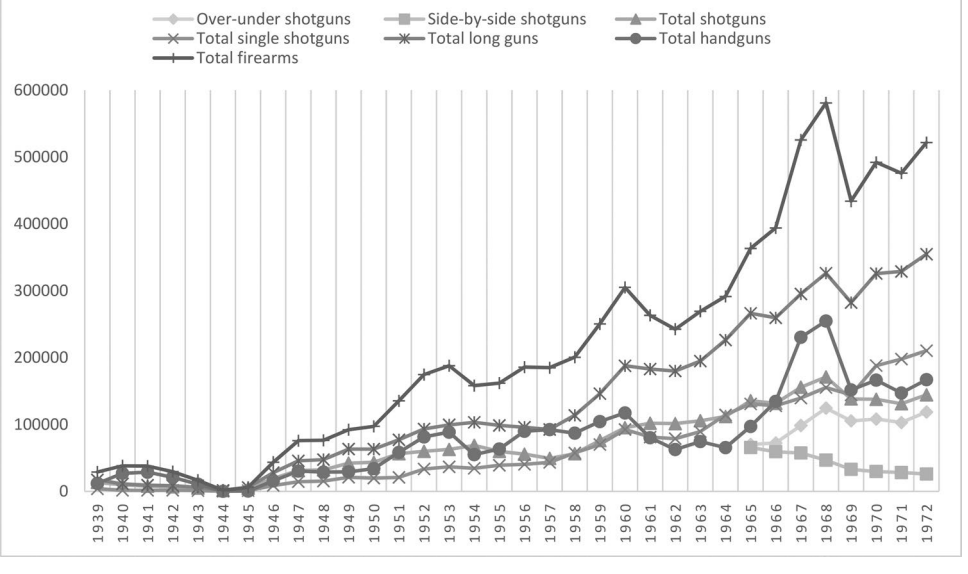

Figure 2. Proofed civilian firearms (1939–1972).
Source. Bontempi (1970, pp. 132–146); Pagani and Camarlinghi (2010, pp. 34–37) (data processed by the authors).

their figures were similar to those of shotguns in the 1950s, but their proportion of total production decreased over the decade that followed (Tosini, 1980, pp. 47–49).

The reproduction of earlier and obsolete types of firearms was another increasingly important market niche. In 1970, muzzle-loading rifles and pistols represented 15.75% of single shotguns proved by the BNP. The first producer was Aldo Uberti, who in 1959—when the USA was preparing to celebrate the centenary of the American Civil War—received an order of 4,000 units of muzzle-loading rifles and pistols. After this unexpected windfall, producers in the valley moved into this novel and unexplored North American market segment. In Montana, North Dakota, and Texas, many hunting and target-shooting collectors and aficionados practiced using these types of firearms (Interview with Pedersoli; Daffini, 1969, pp. 220–222).

These products found their way into national and international markets. The Italian market was important during the very early post-war era, but by the early 1950s, its relevance declined rapidly. This was due to its limited potential and increased constraints on the possession and sale of firearms introduced by the government. The domestic market mainly comprised firearms for hunting, a popular activity with a long tradition, and was extremely sensitive to legislative norms. Severe fiscal tightening through taxes on hunting licences between 1961 and 1962 led to a rapid decline in firearms sales and, consequently, decreased production. Only after the partial reversal of the tax decisions did the decline cease (Bontempi, 1970, pp. 203–210).

Foreign markets played a key role in relaunching the sector. At the end of WWII, exports were at very low levels, but the situation began to improve significantly when Italy joined NATO (Western Block countries) and GATT in 1949 and 1950, respectively. NATO, together with a review of the constraints imposed by the peace treaty, provided firms with new military orders while increasing their sales to the police following the American model for public order management. GATT enabled Italy to market its sporting shotguns beyond national borders (Battistelli, 1980, pp. 90, 128; Del Barba, 2008, pp. 141–146).

Exports, which were relatively low during the early 1950s, gradually grew both in absolute and relative terms, reaching 30–40% of total production in the 1960s (when local production represented 95–98% of national production) (ASBI, BI, Studi, Pratiche, n. 900, doc. 12; n. 920, doc. 11; n. 942, doc. 2; n. 948, doc. 9). In 1953, decent export levels to the Middle East, USA, Belgium, France, Scandinavia, and Portugal were recorded. Between 1955 and 1956—when the domestic market contracted—local companies strengthened their position on foreign markets while approaching new ones, such as Mexico, by attending international trade shows (ASBI, BI, Studi, Pratiche, n. 469, f. 1; n. 479, f. 1; n. 874, doc. 14). During the 1960s, the USA, France, Germany, and the United Kingdom were the main buyers of civilian firearms made in Brescia, absorbing more than 70% of total exports (ASBI, BI, Studi, Pratiche, n. 910, doc. 6; Bontempi, 1970, pp. 219–221).

Transformation challenges and problems in other European gun-making districts made it easier to dominate markets. Production systems such as Val Trompia existed in Belgium (Liège), France (Saint-Étienne), England (Birmingham), and Spain (Eibar). Nevertheless, in the post-war era, the craft component of most foreign districts progressively declined, paving the way for Italian firms. In Belgium, a combination of socioeconomic factors (such as the decline of the home-based system, political instability, import restrictions, and the withdrawal of the Eastern bloc) seriously weakened the gun-making district, which shrunk to eight towns while shifting the centre of gravity from Liège to Herstal due to the pre-eminence of the famous Fabrique Nationale as a source of employment (Gaier, 1985, pp. 215–228). In

Birmingham, component supply shortages (such as moulds, forgings, and barrel-tubes) and legislative measures limiting weapon ownership (Dunham, 1955, pp. 33–35; Williams, 2009, p. 146) further aggravated the profound consequences of WWII air raids. In Eibar, in the Basque Country of Spain, where the gun trade specialised in short-barreled firearms (Goñi, 2010, 2018), two regulations approved in 1941 and 1944 conditioned the authorisation of short firearm production to a single facility, thus forcing vertical integration. Moreover, Basque products were initially affected by the Spanish trade embargo and the limitations of the domestic market, they subsequently became dependent on institutional aid to approach foreign markets (Goñi, 2009, pp. 91–93).

Three major inter-related reasons determined the advantages of the Italian district over its European competitors. First, in contrast to foreign producers who faced significant cost increases, Italian manufacturers had abundant low-cost skilled labour (Castronovo, 2010, pp. 29–31; Forissier, 2005, p. 62; Gaier, 1985, pp. 225–226; Selva, 2012, p. 93). Second, foreign districts underwent vertical integration, experiencing a heavy reduction in artisanship activity (Del Barba, 2008, pp. 150–151; Gaier, 1985, pp. 222, 226–228; Williams, 2009, p. 141). Third, a growing number of foreign gunmakers started to subcontract to Italian producers, fostering a process of technological development in the Italian district, which improved the quality and image of local products (Interview with Pedersoli; Forissier, 2005, pp. 62–63; Onger & Paris, 2012, pp. 83–85). Accordingly, similar to other regions of the country in the 1950s and 1960s, the gun-making district increased production and investment and achieved greater economies of scale and, above all, economies of specialisation of small businesses that represented the primary source of new jobs (Castronovo, 2010, pp. 82–92; Rey, 1982, pp. 505–518).

5. Production decentralization as a competitive strategy

With the introduction of the American system of manufacturing in the nineteenth century, the military sector embraced the path of mechanisation and parts interchangeability, whereas the civilian sector remained loyal to artisanship. Customers, especially in the field of hunting shotguns, continued to seek products created using traditional manufacturing methods where hand fitting played a key role. The production of shotguns required a large number of skilled workers organised in a production chain that included gun barrel makers, lock manufacturers, movement preparers, modellers, inlayers, polishers, chequerers, engravers, repairers, smoothers, brazers, burnishers, finishers, and assemblers (Zoli, 1969, pp. 198–202). These artisans could work as employees within the same company; however, within the industrial district, many of them owned small businesses and were subcontracted. Production growth in the post-war era was achieved because of the multiplication of this decentralised structure.

A total of 62% of firms and 22% of workers associated with firearm production in some form were engaged in subsidiary industries; they executed specific phases in the production cycle or other support activities for end producers (Figure 1). These businesses specialised in producing and repairing parts, specific phases of assembly, engraving, inlaying, chequering, smoothing, and stock manufacturing. Mechanical engineering and woodworking firms operated sporadically in the gun trade according to the market's particular needs and opportunities (Interview with Pedersoli). Gun-part manufacturers supplied the *series*—all the main components of the shotgun—to end producers, who, in most cases, were unable to produce

them; this enabled end-producers to acquire a coordinating function in the production process by conducting and/or subcontracting assembly and refining operations of the *series* to customise the final product (Interviews with Pedersoli, Abbiatico, and Sabatti). Subsidiary activities were mainly directed to third parties, and they differed from end-producers by order-type management, while the end-producers mainly operated with and without pre-orders, the majority of the former carried out their work based exclusively on customer orders (Figure 3).

The family was a crucial element in the local production dynamics. According to the database, 61 of 272 companies (approximately 22.5%) were run by family members or included family members among their employees. However, by excluding firms where the owner was the only worker (120), the percentage increased to 68.5% (ASCCBS, Carteggio 1943–1963, Categorie XXII–XXXII, bb. 947, 959, 980). Likely, even within firms that officially presented themselves as single-person businesses, family members would assist in a sporadic and unreported manner. Anecdotal evidence and interviews indicate that official statistics underestimated the extent of family ties. As repeatedly shown in the life stories of gun-makers collected by Abbiatico (1984), knowledge and skills in gun-making were passed on within families—from fathers to sons, or from grandparents and uncles to grandsons and nephews. It was not unusual for artisans to refuse to train non-relatives, thereby pressurising their employers to hire family members (Interview with Abbiatico). Moreover, family ties were used to temporarily allocate gun-making licences: employed artisans who were setting up their businesses had their licences assigned to one of their relatives (usually their wives). Hence, aspiring entrepreneurs solved two problems: they could overcome the constraints preventing licences from being assigned to employed workers, and they were able to start their business while maintaining their employment in another company.

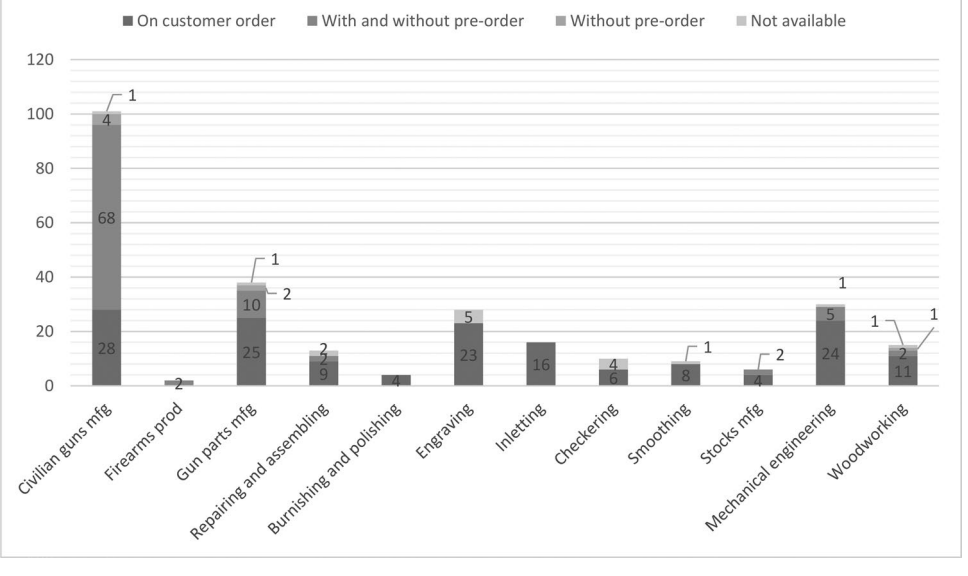

Figure 3. Firms per type of order system in the firearms industry of Gardone, Marcheno, and Sarezzo (1961).
Source. ASCCBS, Carteggio 1943–1963, Categorie XXII–XXXII, bb. 947, 959, and 980 (data processed by the authors).

Although a significant proportion of artisans worked from home (23%), most companies claimed that they had their own premises. However, two aspects are noteworthy. First, these data were not homogeneously distributed; for certain categories, especially businesses specialising in engraving, inlaying, and chequering, their situation was exactly the opposite. Second, all interviewees claimed that home represented an additional workplace after official working hours: when shifts ended, many workers in large firms brought their work home or worked for local artisans in their garages or basements. Those who merely worked the recognised eight hours were considered as slackers by the locals; thus, work permeated people's lives and was regularly brought back home to be completed by the whole family (Interviews with Pedersoli, Abbiatico, and Sabatti).

The large network of SMEs relied on craftworking methods and the technical expertise of their owners. A total of 76% of businesses that participated in the census indicated that they did not mass produce, and only 16% used partially or fully mechanised methods (data for the remaining 8% are not available). A total of 80% of the owners participated in manufacturing activities and worked side-by-side with their employees (ASCCBS, Carteggio 1943–1963, Categorie XXII–XXXII, bb. 947, 959, 980). The owners were also directly involved in the assembly of machinery used in daily manufacturing activities. These craft tools were generally the result of incremental innovations associated with the entrepreneur's technical skills. An artisan's best-adopted solutions were then very often copied by others (Interviews with Pedersoli, Abbiatico, and Sabatti).

The post-war crisis was overcome by reversing the evolution that had taken place in the district in the previous decades. From the end of the nineteenth century, the main companies—Beretta and Bernardelli—driven by military orders during the two world wars, expanded through vertical integration and increasingly concentrated the production of the district. During the 1950s and 1960s, a multitude of new workshops and small companies emerged, developing a decentralised production system that enabled the industry to be highly competitive in the international market for hunting and sporting shotguns. However, the two largest companies, particularly Beretta, maintained the leadership of the district, not only because of their production volumes, earned reputation, and the technology transfer they drove, but also because they were instrumental in shaping the district's dynamics in two ways. First, they contributed to the emergence of a network of SMEs participating in subcontracting practices, especially in the manufacturing phases characterised by low-tech procedures. Second, employees of these leading companies likely had second jobs in the valley's numerous craft workshops. Consequently, a mutual virtuous relationship was established: large end-producers could outsource to smaller units to reduce production costs, while workshops could employ highly trained workers (Interviews with Pedersoli, Abbiatico, and Sabatti; Onger & Paris, 2012, p. 85).

Both Beretta and Bernardelli went back to focussing on military orders as soon as the political and economic context allowed it. Between 1949 and 1951, the Truman administration launched the Mutual Defense Assistance Programs and Mutual Security Programs to provide America's European partners with military aid and assistance while pursuing foreign policy and economic purposes. Initially, these programs were based on bilateral agreements, and from 1951, they were channelled through NATO's multilateral off-shore procurement system (Selva, 2012, pp. 49–54). In the first phase, the objective was to reactivate existing, war-wracked production lines by reorganising and stimulating the output capacity of the average capital- and labour-intensive mechanical sectors through the introduction of American labour

organisation methods (Selva, 2012, p. 91). During the second phase, European rearmament was closely linked to the financial and monetary stabilisation of intra-European trade and payments, as well as to the European recovery from the dollar shortage (Selva, 2012, p. 50).

In this context, throughout the 1950s, Beretta and Bernardelli obtained large military contracts with good profit margins that enabled them to improve their financial positions and offer new opportunities to their subcontractors (ASBI, BI, Studi, Pratiche, n. 463, f. 1; n. 469, f. 1; n. 472, f. 1; n. 479, f. 1; n. 874, doc. 14; n. 879, doc. 14). The revenues obtained facilitated new investments and technological advances, which in turn stimulated new impetus to the civilian firearms sector. In an environment where shared culture and values facilitated the transmission of knowledge and learning processes, these innovations spread throughout the district via various cooperative relationships among the companies and the frequent and close interactions between professionals and entrepreneurs (Giuliani, 2007, pp. 162–163). The system combined the benefits of local clustering with easy access through hub companies and their external connections to innovations and new knowledge. When the military orders declined between the late 1950s and early 1960s, these investments enabled the district to rely on hunting, sporting, and small defensive arms, which had gained an excellent international reputation (ASBI, BI, Studi, Pratiche, n. 479, f. 1; n. 874, doc. 14; n. 885, doc. 9; n. 890, doc. 5; n. 897, doc. 14).

By obtaining contracts for NATO armies under licence from American companies, Beretta was able to establish a specific division dedicated to military products, halting its ongoing downsizing and creating a virtuous cycle that further boosted the relaunching of hunting shotguns (Onger & Paris, 2012, pp. 68–69). The contract for a modified and updated version of the American M-1 Garand service rifle was crucial and had an impact that extended beyond the renovation of equipment. The rifle's tighter tolerances and the complete interchangeability of its components pushed Beretta (who were not machine tool builders) to build machinery based on Garand's principles, which had a deep impact on both its manufacturing system and organisation of production. Significantly, this historical company built its own fixturing, gauging, and tool systems, while introducing statistical process control to constantly monitor machines to prevent process limit deviations (Jaikumar, 2005, pp. 74–77).

When the need to design an assault rifle arose, Beretta's technological capability and experience enabled an excellent conversion of the Garand. At low cost, the old American pieces were given new 7.62 mm NATO calibre barrels, a new magazine and feeding system, and a new trigger mechanism that enabled fully automatic fire upon selection. Under the name BM-59, this firearm—in three different versions—was adopted by the Italian army. Meanwhile, Beretta adapted their machinery and know-how to civilian production: the interchangeability of parts reached 100% for semi-automatic shotguns and 99% for over-and-under guns (Morin & Held, 1980, pp. 234–235; Wilson, 2001, p. 169). Investments in R&D and production quality became milestones in Beretta's business strategy and invigorated its forward-thinking commercial choices aimed at foreign markets. Accordingly, the old gun-making company strengthened its trade ties in South and North America by opening a plant in Brazil and establishing a long-term partnership with Galef & Son, a New York-based company (Onger & Paris, 2012, pp. 68–73).

Bernardelli made significant efforts to exploit the reopening of the international market and secured a solid position in the NATO provisions system (Del Barba, 2008, p. 145). In the civilian sector, the owners decided to recover the traditional side-by-side and launched a

single shotgun with a steel stock, fixed barrel, and removable magazine. It also invested in new machinery to manufacture semiautomatic pistols (calibers 7.65 and 9). In the early 1950s, the company's products were offered to foreign markets, capturing the attention of customers in South America (Brazil and Argentina), Africa (Morocco and South Africa), the Far East (India and Singapore), and the USA. In the military sector, following its wide experience acquired during WWII in fuse production, Bernardelli was able to win large NATO supply contracts, and from 1951 to 1960, it obtained three-yearly orders for 400,000 fuses, and further orders for machine gun barrels and magazines (Del Barba, 2008, pp. 145–147).

The Italian gun-making district thus established a new path of development in the post-war era characterised by increased decentralisation and flexibility of production, with a multitude of small new companies specialising in some phase of the production process. However, the district continued to be hierarchised by traditional large end-producers. The production structure exhibited many of the industrial district's characteristics identified by Becattini (2004, pp. 19–33), but also those that Markusen (1996, pp. 302–304) defined as a *hub-and-spoke district*, caused by the dominance of large and vertically integrated companies surrounded by suppliers. A key factor for the survival of the district was the complex structure of relationships established between existing leading companies and new entrepreneurs. This structure enabled effective competition in a new expanding market segment. The companies that constituted the core of the district managed to maintain, at least partially, their production of military weapons while promoting the development of the production of civilian arms through the generation of spinoffs. This production fabric facilitated the flow of knowledge between the core and periphery of new firms, providing a great capacity to adapt to changes in the market (Piccoli, 1981, pp. 129–131).

As noted in other cases (Amdam & Bjarnar, 2015, pp. 714–715; Hashino & Kurosawa, 2013, pp. 511–513; Zeitlin, 2007, pp. 225–226), the district's recovery process was facilitated by the internal cohesion, norms, and values shared by its inhabitants and firms, enabling the adoption of a common economic strategy. The coordinated action of local institutions that provided generic and specific services to local companies also had a significant influence. Among them, the Zanardelli vocational school, with its specific gun-making training program, played a fundamental role in providing specific skills and knowledge. The BNP, which ensured technical supervision of firearms and ammunition compliance with national and international legal standards, was another key institution because it functioned as an innovation intermediary (Howells, 2006, pp. 720–723), encouraging gun-makers to improve the quality of their products and adopt new techniques (ASBI, BI, Studi, Pratiche, n. 874, doc. 14; Abbiatico, 1984, pp. 65–69). Mediation to solve problems among district stakeholders and national institutions was conducted mainly by local administrations, especially by the Municipality of Gardone where Angelo Grazioli, the local leader of the Christian Democrats, was mayor for six terms (from 1951 to 1980). Grazioli led lobbying activities to prevent the closure of the local government arsenal at the end of the war, mediated labour disputes that affected Beretta and Bernardelli in the early 1970s, and lobbied the government to defend the interests of the arms producers arising from projects to modify sector regulations (ACGVT, Storico, b. 790, ff. 4.1–4.6; b. 833, ff. 3–4; Deposito, b. 'Pubblica sicurezza 1961 – Circolari'; Albesio, 1969, pp. 235–238).

6. Conclusions

The analysis of cases of the resilience of industrial districts in the past is essential to understand the evolution of these socioeconomic formations, how they endured for so long in

difficult times, and what characteristics can allow them to adapt to new crises and remain competitive. The recovery of the Italian gun-making industrial district after WWII occurred in a highly specialised industrial territory that demonstrated a great capacity to adapt to a sector-specific shock (the collapse of military orders) and the general post-war economic crisis, without abandoning its sectoral specialisation. Its recovery was not based on Jacobs-type externalities but rather on the intensification of Marshallian externalities. The district took advantage of its established resources and capabilities by reorganising them and developing a new type of product, civilian firearms, for both domestic and foreign markets. Some companies responded to the collapse of military demand by developing related diversification in mechanical engineering production. However, this resilience strategy was less effective than the novel specialisation within the arms industry. Consistent with the theoretical approaches of economic geography, the advantages of local clustering and elevated levels of specialisation provided the Italian gun-making district with effective adaptation. Nevertheless, it was not merely a short-term adaptation, as suggested by theoretical approaches, but rather the district managed to establish a stable growth path that was maintained for more than half a century (Musso et al., 2012).

The evidence presented here suggests that the district had a competitive advantage through decentralisation and production flexibility, together with cost reduction mechanisms and product differentiation, which enabled access to distinct market niches. The production structure was adapted by intensifying the defining characteristics of industrial districts, using know-how and resources that had historically been consolidated within the local production system. The district developed a large network of SMEs, where two large companies, Beretta and Bernardelli, played a leading role as both manufacturers and social stakeholders. The resulting production chain comprised producers of weapon parts, small workshops (often home-based) dedicated to specialist manufacturing, assemblers, and small-sized firms devoted to high-quality firearms. Beretta and Bernardelli organised a decentralised production structure. Both companies fostered the development of the SME network and established a mutually beneficial relationship. In the 1950s, they managed to channel important military orders to the district, facilitating the technological renovation that fuelled the production of civilian firearms. Both companies were instrumental in improving the international reputation of the district's products and entering new foreign markets.

Another important conclusion is that this system was characterised by a strong labour division, creating a process of progressive sub-specialisation and accentuating the interdependence of its various parts. The predominant relationship between the two main sections of the system was vertical, although the others were generally horizontal. Subcontracting enabled companies to minimise total unit costs by outsourcing destabilising production functions that presented non-homogeneous unit cost trends. These functions were entrusted to companies whose creation was often stimulated by the same company responsible for decentralisation. The new firms, which were predominantly and traditionally specialised in a single phase of the production process, gradually improved their efficiency through a process of *learning by doing*.

A third noteworthy element is that the know-how and consolidated resources in the local production context were fundamental elements. It could be suggested that local culture and values were also important because they determined the behaviour of economic agents, as evidenced by the key role played by workers from large companies. These gunsmiths were the main promoters of the district's small business network, arising from their technical

training in a social context that encouraged a strong work ethic, entrepreneurial initiative, and the use of resources from within the family environment. The strong specialisation of the district implied that local institutions were highly oriented to satisfy the needs of the local industry. They played a key role in the reconfiguration of the production structure, providing essential services, coordinating action in the face of common problems, and intervening in conflict resolution.

Finally, this study shows the need to expand research on issues that are particularly relevant to understanding the resilience of industrial districts and contributing to the historiography of the Italian armament industry. The first issue is the real effect of production specialisation on resilience, and it would be desirable to verify, from a historical perspective, whether highly specialised industrial territories were less able to promptly face recessive shocks than more diversified areas or, conversely, whether specialisation was a source of resources that facilitated recovery. The second theme worth investigating further is the role of leading companies in influencing the dynamics of local production systems: new studies should focus on the relationships between these firms and the rest of the production fabric and the socio-institutional environment, as well as on the influence of these relationships on districts' ability to adapt to technological and market changes. Lastly, further investigations should also be conducted on the role of leading companies in the Italian firearms district. This study reconstructed the recovery of Beretta and Bernardelli's military production in the context of the Western Bloc rearmament programs; however, in-depth analysis using corporate archives could provide further details on the two businesses and NATO's strategies, and the development of the Italian armament sector in the late twentieth century.

Notes

1. Gardone Val Trompia is a town in the province of Brescia, Lombardy, Italy.
2. The notion of *Marshallian industrial district*, re-elaborated by Becattini and other authors on the basis of the Italian experience, refers to a socio-territorial entity characterized by the concentration of small and medium-sized companies, specialized in distinct phases or complementary activities within a common industrial sector, where external economies of access to services and auxiliary industries, accumulation of specific knowledge and availability of specialized labor are obtained.
3. Markusen defines *hub-and-spoke* industrial districts as places 'where a number of firms and/or facilities act as anchors or hubs to the regional economy, with suppliers and related activities spread out around them like spokes of a wheel'.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

This work was supported by: the Ministry of Economy and Competitiveness of the Government of Spain and the European Regional Development Fund under Grant PGC2018-093896-B-I00; the Department of History and Philology of the Catholic University of the Sacred Heart through UCSC funds.

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